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AUTHOR Hokanson, Dean T.; Jospe, Michael
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ABSTRACT

The first of three documents on Project SEARCH (Search for Exceptional Abilities Reachable among Children with Handicaps) considers methods of detecting cognitive giftedness in exceptional children. It is explained that Catell's cognitive model of fluid intelligence is the basic premise used. Individual sections are presented on hearing impaired, physically handicapped, mentally retarded, learning disabled, mild behavioral problem, and severe behavioral problem children. Considered in these sections are the following aspects: the influence of the handicap on cognitive development, the influence of the handicap on the validity of the assessment, interpretation of formal test scores and responses, and interpretations of naturalistic observations. Among tests described are measures of verbal language skills (including the Detroit Test of Learning Aptitude and the Peabody Picture Vocabulary Test); nonverbal performance (such as the Leiter International Scale and the Columbia Mental Maturity Scale); visual spatial relations; sequencing and memory; and social perceptiveness and comprehension (such as the Thematic Apperception Test.) (CL)

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THE SEARCH FOR COGNITIVE GIFTEDNESS IN EXCEPTIONAL CHILDREN

Dean T. Hokanson, Ph.D.

with

Michael Jospe, Ph.D.

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Project SEARCH in its first year of funding under Title VI b, EHA, seeks to identify and serve gifted and talented students in the special education programs of Area Cooperative Educational Services (Greater New Haven Region) and Capitol Region Educational Council (Greater Hartford Region).

Please address all inquiries to:
Alan J. White, Coordinator
Project SEARCH
Educational Center for the Arts
55 Audubon Street
New Haven, Connecticut 06511.

THE AUTHORS

The authors are both presently employed at the Newington Children's Hospital, Newington, Connecticut, where they work with a variety of exceptional children and their families.

Dean Hokanson - A. B. Duke University, 1967; Ph. D. University of Texas, 1971; Internship at the Institute of Living, Hartford, Connecticut, 1970-71. Dr. Hokanson is the Assistant Administrator for Patient Services and was the Chief Psychologist at Newington Children's Hospital before he assumed his current position. Dr. Hokanson is an adjunct faculty member of the University of Hartford and St. Joseph College and is also a consultant to the CREC Hearing Impaired Program. In addition, Dr. Hokanson maintains a private practice in West Hartford, Connecticut.

Michael Jospe - B. A. University of Leeds, England; Ph. D. University of Minnesota, 1974. Internship at the University of Minnesota Health Services Center, Minneapolis, Minnesota. Dr. Jospe is the Chief Psychologist at Newington Children's Hospital. He has taught at the University of Minnesota and his professional interests are strongly focused toward the integration of clinical and health care psychology.

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PREFACE

Project SEARCH is committed to the notion that intellectual and creative gifts and talents are to be found among handicapped children, although the abilities may be masked or submerged by the handicapping conditions. Furthermore, a full assessment of such children should include a rigorous search for exceptional strengths as well as deficits.

Although every special educator and diagnostician would subscribe to thorough assessment procedures, it often happens in practice that the areas of deficit receive almost exclusive attention and become the sole basis for prescriptive programming. The purpose of this paper, therefore, is to sensitize professional personnel to the feasibility of searching for cognitive strengths or intellectual giftedness. It is also hoped that the paper will bring together in one publication a number of practical screening procedures which are found in scattered sources or learned only through years of experience. It should also provide a rationale for the valid use of common standardized instruments with special populations.

The real value of this paper will be determined by its usefulness in identifying gifted handicapped children and in providing direction for programs which build upon their strengths.

INTRODUCTION

This manuscript is being written for two purposes: 1. To allow those people currently working with and responsible for children with a variety of handicaps to be alerted to methods for identifying possible giftedness in cognitive or intellectual abilities in exceptional children and, 2. To serve as a guide for those people screening and evaluating exceptional children for possible cognitive giftedness. It is not intended to be a sophisticated tool for professional clinicians, but rather a means to identify those children who may be more thoroughly evaluated by a professional clinician in the search for cognitive giftedness. Our hope is that our model and procedure will allow the people working with these children to focus their perceptions on the dimensions and signs which we consider crucial in assessing cognitive functioning. Although we have attempted to credit the people whose ideas are being used, some of the ideas expressed, while not our creations, do not have a specific author to credit. Also, while the field of tests and measurement has a rich history now of just over seventy-five years, the technology of testing instruments, as well as the formulation of theoretical concepts, is still in its toddler stages. As such, although some of the statements we make have some research evidence to support them, others may be considered as working clinical hypotheses. All that we have written about we have found useful, and it is with this intent we hope it will be to the reader also.

THE OVERALL PROBLEM

Many people have stereotyped ideas about exceptional children based on the impression these children initially make. Even professional people are often overwhelmed by the apparent deficits these children have , and it is only slowly, over a period of time that the child's individual personality and individual strengths emerge. An observer might assume a severely impaired child with cerebral palsy to be retarded because some of the things we often see in retarded children are commonly seen in the cerebral palsied child. An example would be a grossly impaired expressive language ability. With the lack of this function it is very easy to underestimate a child's level of intellectual functioning. Even professional evaluators are often uneasy when the child's communication is so impaired that it contaminates the validity of the assessment. The clinical issue is one of deciding how to assess the level of reasoning when the control of the musculature involved in speaking or pointing interferes with establishing a response system. While the above is only one example, it serves to illustrate the overall problem which this manuscript addresses: namely, a handicap in one or more areas of functioning does not mean a suppression of abilities in all areas of functioning. It also seeks to answer the questions of how a diagnostician finds those areas of superiority.

The need to assess cognitive abilities has led to the creation of a wide variety of instruments designed to measure various aspects of psychological functioning. These range from measures of overall intellectual functioning to more specific measures of such functions as fine motor coordination and memory. We shall mention the assessment tools we prefer and their areas of assessment later; at this stage we want to emphasize a truth which is occasionally forgotten: in all these tests we are measuring some level and type of behavior which corresponds with, or is assumed to be representative of the particular trait in which we are interested. We are thus using a behavior to measure an attribute. What we are ordinarily doing when we use any psychological test with a child who can talk, hear, see, walk, and write, within average limits (to varying degrees), is to equate the status of a cognitive ability with the measured level of the performance. These observables are predicated upon the measurement of behaviors using

standardized tests. With the cerebral palsied child mentioned earlier, the behavior we are interested in (expressive language) cannot be measured using standardized tests. Does this mean the attribute might not exist to any extent, or that it does not exist at all? In addition, because tests are standardized for normal children, does this mean they are therefore a priori invalid for the assessment of abilities of exceptional children?

Our answers to the last two questions are based on our clinical experience with all types of exceptional children and the use of standardized tests in these situations. Our assumption is that the ability is there, and we will devise any assessment we can to demonstrate and measure it. The goal is not to make the task easier, but rather to make it possible. Hence, eye blinks as a response measure may at least allow the administration of a verbal test which requires yes - no answers using one eye blink or two as the responses.

If the test can be set up in such a way that the person performs without a lessening of difficulty in the task, then we use the standard tables of norms for comparison with peers. In this manner the level of performance may be assessed on the same criteria as all other peers We do not believe, for instance, in special tables for hearing imparied children. Rather, we would expect certain areas to be severely depressed when compared with peers (language), other areas to be moderately depressed (non-verbal context where language would aid), and other areas not necessarily depressed at all. In this manner we are allowing the child to be considered superior when he has developed an ability to that high a level - not because he has overcome great odds merely to be achieving at an average range. As will be discussed in the clinical sections on different types of exceptional children, it is often the other areas of "expected" low performance which, when higher than expected, give a clue to potential superiority.

Since the ultimate goal is to obtain a valid estimate of the amount of an ability and therefore the measure of a psychological function the child possesses, we must do everything we can to make sure we do not obtain a level of performance which is not an accurate indicator of the underlying function.

Later discussion of various types of tests will allow consideration of particular factors relevant to each type of exceptionality and each type of test, and allow us to concentrate on maximizing the result of the standardization and the whole meaning, both while testing and in terms of implications of those psychological functions we are measuring in the cognitive realm.

As such, the goal will be to examine how selected handicaps may delay certain aspects of development, but still allow other areas of cognition to develop at a superior level. Likewise we will examine how a variety of handicaps may mask or inhibit the manifestation of a level of cognition during assessment. In this manner we will discuss the problem of attempting to assess potential or latent or masked cognitive superiority, even though its expression in many instances is not immediately evident.

THE MODEL

All tests of capacity are measures of actual performance, and one can only infer the basic capacity. As such, many factors must be taken into account and one must consider any contaminating influences. It is necessary to study as many specific individual areas of functioning as possible and to look for splinter strengths in these areas as well as patterns of abilities which would reveal a more generalized area of superiority (a clustering). To be high in all areas would be true intellectual superiority but the influence of the handicap makes this latter improbable in exceptional children.

The cognitive model we are using is that of Cattell.[1] The model postulates that everyone is born with a certain intellectual capacity and this capacity varies from person to person. Cattell calls this undifferentiated matrix "fluid intelligence." Philosophically, it is reminiscent of Spearman's "g" factor as an underlying factor involved in all intellectual activities. Cattell sees the cognitive development which progresses throughout childhood as a movement to more and more specific differentiated abilities such as verbal abilities, numerical abilities, spatial abilities, mechanical abilities, perceptual closure, ideational fluency, and inductive reasoning. While he has specific measures to assess each area, the important concept is the idea of relatively independent aspects of cognitive functioning, all of which should be examined.

While all cognitive and developmental theorists view cognitive development as a movement from a global, undifferentiated state to a finer and finer process of discrimination, differentiation, and specificity, most of the test designers and clinicians in the past have stressed average scores or composite scores as an index. For example, a full scale IQ on the Wechsler Intelligence Scale for Children is the average of ten individual subtests. Other tests produce a single measure of visual-motor integration or a single measure of non-verbal reasoning. With exceptional children, more so than with non-exceptional children, these average measures must be avoided at all costs. The clinician must look at all aspects of the data breaking cognitive areas

1. Cattell, Raymond. The Structure of Intelligence in Relation to the Nature-Nurture Controversy. In Comero, Robert. Intelligence: Genetic and Environmental Influences. Guine and Stratton, 1971.

down into more specific ability areas. In this manner, the child whose performance is depressed in one or more areas because of his difficulty may still be found to have a superior level of functioning in another area. In this manner, either a legitimately depressed area or an area which is hard to assess (invalid measure) would not depress the superior area by combining all scores into an average score. The model leads one to attempt to asses as many specific areas as possible, treating each one as a legitimate measure in its own right.

The child's development, of course, is also affected by his environmental interactions. Regarding the influence which a handicap has had on a child's development,the history and background are crucial factors. The child's milestones and rates of development in all areas will give a clue as to how specific or how general an influence the handicap may have had in deterring his development. If a physically handicapped child has been deprived of experience because of his lack of mobility,one would expect deficits in certain areas of cognitive functioning. If a physically handicapped child had not been deprived of experiences, but the cognitive deficits were still present, the prognosis is poorer for adequate development in that area. If the experiences were poor (e.g., poor language models) but the child had still progressed to a near superior level, then one hypothesizes a superior potential just waiting to be manifest through an opportunity for enrichment.

The result of the above orientation allows the clinician to maintain a developmental focus where the actual level of functioning is considered, as well as the rate of development of a function, and earlier opportunities for development as ascertained from a child's developmental background. With these two considerations, a current average level of functioning in two children may in fact mean different conclusions in speculating on the child's potential for cognitive giftedness. To attempt to address this facet of the area in more concrete terms, we have tried to include various aspects of naturalistic observations and developmental trends which would lead one to suspect superior cognitive abilities in an exceptional child. These are found in the chapters on individual types of children.

We are not going to report on every type of exceptional child in this manuscript. Instead we have chosen: 1. hearing impaired children, 2. physically handicapped

children, 3. mentally retarded children, 4. learning disabled children, 5. mild behavioral problems, and 6. severe behavioral problems. We believe that the general principles we describe would apply to other types of exceptional children as well.

With each of these individual sections on the children, our format will be to briefly discuss: 1. how the handicap tends to influence cognitive development either directly or indirectly, 2. how the handicap influences and potentially contaminates the validity of the assessment procedure, 3. what to look for in formal test scores and test responses, and 4. what to look for in more naturalistic observations to suggest cognitive giftedness.

THE RATIONALE BEHIND THE ASSESSMENT

When working with anyone, child or adult, it is important to have a cooperative subject. Rapport and cooperation and the formation of a working alliance become even more important with exceptional children. A willingness to persevere, to work when frustrated, to perform so that the examiner has the opportunity to collect relevant data are all crucial. The tendency for the child to quit quickly, to use avoidant mannerisms (often because of his self-consciousness regarding his handicap) are especially important. To obtain a valid picture of the limitations set by a handicap, to assess the functional level of a process, and to look for the cognitive strengths which are still there either by ways of compensation or areas not affected by the handicap, all require special interpersonal and clinical skills of rapport building as a necessary (though not sufficient) condition. We stress these factors because a parent or teacher will often describe tasks that the child has been observed doing that the examiner is unable to reproduce. To compensate for this problem, we would encourage gathering comprehensive data from all those who know the child well, and then stress support and interest at the beginning of the evaluation.

Before we discuss the formal test instruments we employ, an overview is required of how the person operates as a cognitive being. The model is that of information processing, and our main influence has been that of Kirk, McCarthy and Osgood[2] and their ITPA model and dimensions.

The first part of the process is reception of the stimuli, both in terms of sensation (detecting the stimuli) and perception (organizing the stimuli). We shall discuss hearing impaired children as one type of loss of sensation and learning disability children as manifesting select problems in either auditory or visual perception. The major aspects of perception we shall examine are discrimination, figure-ground relationships and closure, spatial organization, sequencing and memory.

Both sensation and perception are fairly automatic, low level processes which occur

2. Kirk, S.A. and McCarthy, J.J. The Illinois Test of Psycholinguistic Abilities - An Approach to Differential Diagnosis. American Journal of Mental Deficiency, Nov.1961, 66 (3) 399-412.

without deliberate thought, and their main function is to get the information to the person in some organized form - the process of reception.

The ability to derive meaning from the stimulus, to decode it, to comprehend it, to realize its symbolic meaning, and then to associate to it, to reason and think are all higher level cognitive functions. They may involve concrete or abstract concepts, and the input may be verbal or visual, but the process is that of dealing with symbols and deriving meaning from them.

The process of encoding is performing a synthetic cognitive process to organize and formulate a response - to use symbols to convey meaning. This thinking may be based on disciplined reasoning to give a specific answer or it may be creative free association. Regardless of which it is, the response tends to be communicated through either the spoken word (verbal expressive language) or a motor action (written language or a gesture such as pointing). These latter functions are considered aspects of expression.

Our attempt will be to show how we assess each of these areas before we move on to the individual types of children about whom we are concerned. The model allows us to pick out individual tests which stress one aspect of the above process, attempting to minimize the demands on other aspects of the person's cognitive functioning. While we realize that the person always behaves as a total unity in complex tasks, we are more able to pinpoint strengths as the tasks become more simple and the functions involved more specific. Hence these are "tested" measures. When the child encounters the real world again, his ability to function may continue to be masked by the handicap; but having identified the superior ability, we may teach to it and encourage its development rather than use the functional level as the only level of development.

THE TESTS

We do not believe it is necessary to go beyond the typical standardized tests used by almost every clinician to assess cognitive talent. In many cases certain aspects of the testing procedure must be modified in order to obtain valid responses. We do not consider this modification as an invalidation of the test score (although technically it is), rather we consider it a clinical use of the tool in an attempt to establish a means of measuring a process or function inside of a person which would otherwise go undetected. To use an extreme example, if a cerebral palsy child with severe hand control problems were forced to manipulate pictures or blocks himself, he might totally fail a task even though he "knows" where each block should go. If the task was to attempt to measure visual-motor coordination, then it would not be altered, and he would do poorly as his inability indicates. Should the task be emphasizing non-verbal reasoning, however, we may let him tell us verbally where each block goes and we will put it there - a modification in the testing to be sure, but one which allows us to assess his non-verbal reasoning without the handicap contaminating the detection of the function at which we are looking.

The tests we use for assessing aspects of verbal language skills include the Wechsler Intelligence Scale for Children, the Stanford Binet Intelligence Scale, the Illinois Test of Psycholinguistic Abilities, the Detroit Test of Learning Aptitude, and the Peabody Picture Vocabulary Test. All of these tests are popular and widely used. In the first four, language tasks are subtests of a larger battery of subtests, and one may assess expressive vocabulary, verbal concept formation, verbal likeness and difference concepts, verbal comprehension, social judgment verbal analogies and relationships, and a variety of verbal reasoning functions. Both in terms of the language concepts and the content of the questions, experience with ideas and objects in the typical middle-class range are a prerequisite. Hence these tests are very "culture bound."

While most of the language tasks have a listen (auditory) and speak (verbal) format, the Peabody Picture Vocabulary Test and the ITPA Auditory Reception have a listen

(auditory) and either point (PPVT) or shake your head (Aud. R.) possibility so the emphasis may be on receptive comprehension and not verbal expression. This latter component would be important if poor verbal expression would reduce a child's performance on a task designed to measure verbal comprehension.

The tests we use to assess non-verbal areas are the Leiter International Scale, the Columbia Mental Maturity Scale, and the Progressive Matrices by Raven. All three of these tests give a single score which can best be conceptualized as a measure of non-verbal reasoning in school-age children. They involve the ability to see relationships, patterns, sequences, and to reason in both concrete and abstract ways, depending upon the age level reached. While the Leiter does involve the use of some meaningful stimuli, we are not impressed by the influence this characteristic has, for instance, on a language impaired child. All three of these tasks can be given without any demands on the part of the child to perform with any degree of fine motor coordination. In fact, the examiner can do all of the moving of objects if he can establish a communication system with the child (e.g., the child blinks twice when the examiner points to the correct answer).

There are also tasks on the WISC performance scales, the ITPA, the Stanford Binet, and the Detroit which emphasize seeing and doing and have a non-verbal task demand to them. These vary in terms of how language serves as a mediator when doing the task, but this issue will be discussed when we present problems encountered with specific disabilities in children.

Other non-verbal tasks, as defined by the type of the stimuli and the motor response required (although the directions may be given orally), include the perceptual tasks and visual-motor tasks such as the Frostig Test of Visual Perceptual Development, the Beery Test of Visual Motor Integration, the Bender Motor Integration, the Bender Motor Gestalt Test, and the Draw-A-Person (DAP) technique. Coding on the WISC is helpful here also. The Bender, Beery, Coding, and DAP have a visual-motor format and employ the use of a pencil to either reproduce geometric designs or draw a person without a model to copy. The Frostig has two subtests with this same emphasis (Eye-Hand coordination, Spatial Relations), but other Frostig subtests emphasize visual perception in a more exclusive manner without the stress on the motor component.

Coding (WISC) and Motor Speed (Detroit) emphasize visual-motor speed when using a pencil.

To assess the aspect of visual spatial relations (figure-ground), we look to the WISC Block Design and Object Assembly, the ITPA Visual Closure and the Detroit Disarranged Pictures. It is the visual motor and visual spatial which we consider to be the main perceptual areas to be investigated.

When the area under investigation is sequencing and memory, we use the WISC Digit Span, ITPA sequential memory tests, the Detroit attention span subtests, Oral Commissions and Oral Directions. The stimuli and the mode of input vary a great deal, and one can ascertain how general or specific a memory strength there is in the child.

The last general area involves social perceptiveness and comprehension. Verbal tests like the WISC Comprehension and Detroit Social Adjustment I and II are helpful, as are general qualitative aspects of the Thematic Apperception Test and Make A Picture Story Test. We consider this area important,as a child's social intelligence and his ability to deal with verbal symobls are not necessarily correlated. These areas will be discussed very little because one does not measure them in as formal a manner as the other areas mentioned above. We would like to encourage those working with handicapped children to consider social abilities and social intelligence as one aspect of cognitive functioning.

DIMENSIONS OF THE ASSESSMENT

With regard to the dimensions of the test data, we consider twelve of them important. These dimensions allow an examiner to group together a child's performance in certain ways to isolate where the giftedness appears. Again, the trend is not to average, but to attempt to isolate differentiated areas. We call this process "clustering" and it is important in orienting the clinician's investigation and as a tool in describing the areas of functioning.

I. Is the task a verbal (auditory) input or a visual (sight) input? We rarely use tactile or kinesthetic input, as most knowledge after the age of three years comes through the visual and auditory channels. This dichotomy is the traditional verbal vs. non-verbal design.

II. Do the stimuli involve symbolic material (words, pictures of real things) or non-symbolic material (such as shapes or nonsense words)? This dimension leads to a distinction between more automatic tasks and those which are representational tasks, a dimension which is really a perceptual / cognitive dichotomy (more cognition involved when dealing with symbols).

III. Is the task one which involves concrete or abstract thinking? The vocabulary word "donkey" is fairly concrete; the vocabulary word "remorse" is fairly abstract in terms of the referent each stands for. Matching two objects on physical dimensions is concrete; matching according to function is more abstract.

IV. Does the task provide structure or not? Block Design (WISC) is a structured spatial relations task in that the child is provided a model; Object Assembly (WISC) is a less structured spatial relations task in that the child has to use his own visual memory of the shape of an object to guide his performance. A verbal task requiring a single word response is more structured than one where the child has to formulate and respond at length.

V. How much verbal formulation and verbal expression is required? A child may do poorly on a task requiring much verbal expression even though he comprehends the question and knows the answer. He might be too anxious and inhibited to speak freely, or he may have difficulty formulating and organizing his thoughts. Hence, language tasks vary from no verbal response through a single word response through a full sentence or more being required.

VI. How much context is employed or how much does the information stand by itself? A question such as, "What should you do if you find an envelope that is sealed, addressed, and has a new stamp, in the street?" has much context to it; the child can probably picture the scene. The question, "What is a post office?" has less contect to it. Repeating back a sequence of unrelated words has even less context. Drawing a person has more context than drawing a geometric design. The importance lies in the fact that contextual material allows the person to associate much more readily than does an individual bit of nonsense information.

VII. How specific, detailed, and differentiated is the material one is considering, or how general is it? "What are the four seasons of the year?" is a detailed question. "How are winter and summer different?" is a less detailed question. One aspect of this dimension involves how much variety there may be in a response and how specific a retrieval function is required.

VIII. Are any numbers or number concepts involved (time, distance, quantity)? Reasoning with quantity seems to be independent of verbal reasoning and much more related to early spatial organization functions. It also involves a certain disciplined type of concentration as there is less margin for error in formulating a response.

IX How much motor planning and responding is involved? Motor responses can vary from a simple form to a non-meaningful, but planned line through a maze, to having to form symbols using motor movements (writing words). Since motor responses are one of the two major response systems, a difficulty in this area can interfere with performance on many tasks.

X How much passive rote memory is involved, or how much thinking is involved? Memory is an important psychological function, and it comes into play in almost every task presented to the child. There is a difference between presenting new information and then asking the child to repeat it, asking questions about what the child has remembered from the information he has been exposed to in his life, and asking the child not only to remember, but to apply what he has learned in a new situation (thinking). This memory-versus-thinking dimension is an important one in determining rote from reasoning skill levels.

XI. How much do sequential operations apply to the tasks, or how much is the information able to be done in several ways? Those tasks which must be done in a specific sequence require more planning than those which lend themselves to a trial - and - error approach. Hence, there are two elements involved, 1. whether the response requires a specific sequence or 2. whether doing the responding in a specific sequence leads to the answer (doing a two-step math problem). The opposite are those tasks which allow associating and thinking in a variety of directions until formulating the answer.

XII. How much do the tasks involve showing what the child has learned via memory and modeling (imitation), or how much does it involve him discovering his own solution? There are many tasks which allow the child to tell you what he already knows or show you how to do something he has learned. There are other tasks where he must apply what he knows to arrive at a reasoned-out solution for a task he may never have seen before.

We consider these clusters important as they allow one to consider a set of scores with a variety of dimensions. When one finds a dimension which "fits"(i.e., the child does well on those tasks at one end of the dimension, poorer in the middle, and poorer still at the other exteme), it allows the scores to be clustered and thus to describe the superior end of the dimension in more detail. It also allows one to predict performance in new situations depending upon how many of the variables included in the important dimension are present in the new situation.

It should be apparent that all tasks may be considered along these dimensions, even though some may apply more than others. As such, with the dimensions as a background, all one has to know is a description of the task (not its name!) to place it in any dimension. Without the ability to cluster tasks according to the functions involved, one can become overwhelmed by a large number of test scores and apparent contradictions. With them, assessment becomes exciting and the examiner becomes a detective trying to put the clues together to identify the specific superior area of cognitive functioning. We believe that these dimensions are relevant not only for the tests we have mentioned, but for all activities in which the child engages. A careful observer can often predict how a child will do on a particular test based on observations of the child dealing with similar task demands and using the same psychological functions.

HEARING IMPAIRED CHILDREN

A. Of all of the handicapping conditions, and their effect on cognitive development, a hearing loss is one of the most interesting. While the early years of sensory-motor and perceptual-motor integration and differentiation are able to take place adequately in the tactile, kinesthetic, and especially visual area, the auditory channel is eliminated. As such, the child's babbling eventually gives way to few or no attempts at verbal expression since there is no auditory completion of the feedback to the child.

Since the child is a visual learner, the quality of social comprehension and general understanding of social context is also qualitatively affected due to the absence of verbal and language cues which may be used for orienting, decoding, and processing the information.

The most significant aspect and influence on cognitive development, however, occur as the child moves into the middle of the concrete operations stage of thinking (elementary school age). Because of the tendency to focus on visual cues, the hearing impaired child continues to operate in a concrete manner longer than non-hearing impaired children, and he is slower to develop concepts of conservation and the principle of invariance. The explanation for this delay would seem to be contained in the inability to manipulate internal (verbal) symbols due to the verbal language deficit which is secondary to the hearing deficit. The hearing impaired child tends to deal with the immediacy of the visual stimulus rather than use the visual stimulus as a springboard for the active verbal language thinking and associating. A related tendency is the hearing impaired child's tendency to group objects according to size or color (physical dimensions) rather than function (a more abstract dimension).

While cognitive development and language development seem capable of developing independently, they do interact with one another. The thought structure at seven is concrete - oriented around the labels of words and their functions. Slowly, after the age of seven, these two areas fuse so that the assessment of one often becomes an assessment of the other as well (both linguistic and logical concepts become meshed in verbal language symbols). This paper will not examine the nature of the

dependency between language and cognition in any more detail, but others are currently doing so.[3]

The last stage of cognitive development occurs at age 11 or 12 and is called formal thinking operations, i.e., the development of more abstract thinking. The adolescent does not have to deal merely with the concrete here and now, but can begin to do abstract hypothesizing. How does a hearing impairment and secondary language delay influence this period of development? Furth[4] has shown that language deprivation delays some aspects of formal operations thinking, but not all of them. The language ability is certainly facilitative with regard to abstract thoughts and there will be certain abstract reasoning areas where the paucity of language concepts limits the level of performance.

All of the above considers only the child who continues to experience verbal language input via amplification and lip reading. Those children who learn in a visual mode through signing and finger spelling have a different cognitive experience, but we do not work with these children and will not consider them in this paper.

There are many areas of cognitive functioning which rely on visual input and do not involve meaningful material, or which involve motor responses. In these areas the hearing loss will not necessarily hinder cognitive development. In fact, with the increased reliance on visual cues, many of these children develop their visual perceptual areas to a very high level in a compensatory manner.

B. The actual hearing loss interferes with the assessment mostly in three ways: 1. conveying directions and instructions about performing a task, 2. asking verbal questions, and 3. demanding verbal responses from the child.

Directions can be a problem, so we use a variety of written instructions, several extra examples which we do ourselves, and finally terminate the test if it is apparent that the lack of comprehension about the task demands is contributing to a poor per-

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3.Hutson, Barbara. The Relationship of Children's Language and Cognitive Redevelopment. Paper presented at APA meeting, 1974.

4.Furth, Hans G. Linguistic Deficiency and Thinking - Research with Deaf Subjects - 1964-1969. Psychological Bulletin, 1971, 76-58-72.

formance. Especially on tasks where timing is required, if the child does not start off with a clear understanding of what is required of him, while he may gradually infer the rules and strategy as he goes, his trial-and-error learning will reduce his actual performance.

With regard to the verbal questions, a child's ability to lip read and handle verbal input must be assessed. As such, we tend to use tests of verbal questions more as functional levels than as true indicators of the child's reasoning ability. We do not expect this area to be anywhere near superior because of the significant impact of the hearing loss on the development of language.

The verbal response demands are a more interesting aspect as there are several tasks on the tests we use which involve visual stimuli to look at, but then require a verbal response (Picture Completion, Pictorial Absurdities, Visual Attention Span for Objects). We tend to be lenient in our scoring of these tasks if the idea is stressed, even though the language delay limits detailed elaboration. These tasks are interesting in the sense that two avenues of solution are available - the child may use visual association areas or attempt to think with verbal symbols. Hence, a high performance in this area is signigicant as it means that even with the language delay, the higher order reasoning abilities can be conducted at a high level. To the extent that the task demands a limited verbal response (one word) and the vocabulary is within the child's ability (yes, no, a single digit, a name), then the verbal aspects do not hinder the performance and the measure will be a more valid indicator of the cognitive area being measured.

C. While the former section mentioned the significance of those tasks which have visual input but which require a verbal response as good indicators of the generalized effect of the language delay on cross-modality (visual-verbal) reasoning, the major indicators of strength will be in the non-verbal, memory, and the motor areas.

We look to the Leiter and the Ravens to give us an overall general measure of non-verbal reasoning. We then look at the Picture Arrangement subtest to get a general

measure of non-verbal social reasoning. No verbal response is required on any of these three tests.

The task then becomes one of focusing on the more specific aspects of visual and motor abilities: visual closure and spatial relations (Visual Closure, Block Design, Object Assembly, Disarranged Pictures), visual memory (Visual Sequential Memory, Visual Attention Span for Letters, Objects), and visual-motor integration (Bender Gestalt, Coding, DAP, Motor Speed).

If the generalized non-verbal ability has been in the superior range, and all but one or two of the more specific visual and motor tasks are also superior, our attempt is to analyze the reason for the lower scores. The test dimensions described earlier are the basis of this process. For example, several subtests are facilitated by having language because they deal with meaningful objects (Visual Reception, Visual Association) than are others (Bender Gestalt). Hence, the lack of a completely superior profile only leads to an opportunity to explain in more detail why, when, and where, a person will have more difficulty than he normally does. This reasoning is exactly the same (only the inverse) of explaining a splinter strength - all areas in the high average range but one or two which fall in the superior range. The questions then become: "What do these two tasks have more of or less of than the others," and "What does that tell about where the person's superior skills lie and what the limits are of his functioning at that level?"

With these children we are also especially interested in the child's ability to focus, concentrate and visually discriminate (Picture Completion, Visual Closure) as these skills are very important in lip reading.

As clusters of superior functioning are identified, the process becomes that of describing the limits of the superior ability, i.e., when what requirements are added does the person's functioning begin to fall below superior?

Generally the non-meaningful, visual input, motor output tests (Leiter, Ravens, Block Design, Frostig Tests, Visual-Motor Tests) are the start of the analysis. In addition, memory and closure should be looked at for more automatic functioning levels. Failure to find any superior level in these areas would make cognitive superiority unlikely.

We call single area superiority a splinter strength. A group of abilities in the same area of functioning (a cluster) we consider to be a superior function (spatial organization for instance). Obtaining superior levels in functions with both reasoning and perceptual bases leads one to argue for generalized cognitive superiority with a less efficient area of skill to describe a less than 100% superior performance.

D. The most significant naturalistic observations involve social skills and verbal language skills. The good non-verbal, visual and/or motor skills would have shown up on the test results, so we shall not stress them here. Likewise they show up quickly on academic tests also.

The first clues of cognitive superiority are generally seen in hearing impaired children in the manner they infer rules from their social and real-world experience, how effectively they learn routines, how quickly they take initiative in generating their own learning (by using a toy or object in a different, unique manner), and how well they organize their behavior and plan. Most of these attributes may be observed in playroom situations. There is a "quickness" to how they learn which is indicative of their good intelligence. Likewise they stimulate their cognitive growth in their manner of attempting to learn even more. This latter is true whether it is a social experience, an experience with a concrete object, or just observations of how the world operates.

The other significant aspect to observe is the rate of language acquisition. In a child with a significant hearing loss, his ability to acquire, process, and use verbal language is severely limited. As such, a child who begins to move ahead of his hearing impaired peers is doing so partly bacause of personality factors and social influence but a great deal because of native intelligence. Here is an example, therefore, of how rate of development in the most deficient area can actually be a clue to cognitive superiority.

Further observations which may be made are use of tools and toys, motor dexterity, and the ability to organize parts and pieces based on discrimination and understanding.

In many of the above areas, the child may be observed with non-hearing impaired children to observe his level of development, and comparisons as to cognitive development progress may be made.

PHYSICALLY HANDICAPPED CHILDREN

In this chapter we will look at some effects a physical handicap has on development, and then we will discuss some aspects of the effect of a physical handicap on a psychological assessment. We will cover both the child whose handicap has been present from birth and so has had a broad, far ranging effect on his cognitive development, as well as the child who suffers a trauma and therefore loses abilities that he once had.

A. There are many areas of development which might be affected by physical handicap and disability. A child born with a handicap or developing one early in life will face an immediate and very obvious difference in developmental relationships from those experienced by non-handicapped children. The number of people other than the immediate family who will become an important part of the child's life will be great in some instances, impoverished in others.

These children may spend extended periods of time in hospitals and be in daily contact with many helping professionals. It is possible that this will mean some disruption of the usual pattern of development of social skills and relationships.[5] It does not provide the child with consistent environmental patterns of stimuli, both concrete and social, and so may disrupt his perceptual and cognitive development. Social and affective relationships may be disrupted which also tend to affect motor and intellectual development as the child is in a constant state of adjustment, fear, or adaptation without the long periods of time required to assimilate and accomodate experience so as to foster cognitive growth.

On the other hand, when at home, a physically handicapped child may be so overprotected as not to allow sufficient opportunity to experience and learn from new situations, toys, people, and stimulus patterns. The child's cognitive development becomes stunted due to the lack of stimulus variety in his world. Day-to-day living presents children with complex situations and task demands which stimulate the development of perceptual and cognitive abilities. A hospital or an overprotective, limiting home environment will not

5. Stephen, E. and Robertson, T. Normal Child Development and Handicapped Children. Modern Perspectives in Child Psychiatry, ed. Howells, J.A. New York: Brunner/Mazel, 1971, Chapter IX.

generally provide these opportunities.

The child's physical limitations reduce sensory-motor and perceptual-motor learning experiences during early life (first 18 months). As such, his later language and cognitive skills do not have their roots in motor experience, and this limitation makes certain cognitive development more difficult for the child. For example, given the lack of experience (or at least the limitation of experience) in tactile, kinesthetic, and movement modes of learning, the child cannot match these modes with labels and ideas as he begins to develop concepts and higher order thinking. His learning is also limited by the fact that the world has to change for him to perceive it, he cannot move to a toy or object and change it by acting on it and thereby learn from his own actions.

Another aspect has to do with imitation and learning from models. Children with physical handicaps cannot imitate much of what they see and therefore do not have the opportunity for cognitive growth through imitation. Likewise the tendency to have limited social contact means that observation, imitation and social stimulation as precipitators of cognitive development are also reduced or eliminated.

All of the above are more or less a factor depending upon the severity of the physical defect and the manner in which the family responds to the child and organizes his development. To look at these influences in more detail, in our section on test results, we will pick out those individual perceptual and cognitive areas most affected by a physical disability.

There are two other important aspects in assessing the impact of a physical disability. The first is that many conditions caused by brain damage (cerebral palsy) have affected the neurological substrate where perception and cognition is being developed as well as motor abilities. As such, many perceptual, cognitive, language, and integrative problems (deficits) may be attributed directly to the central nervous system problem and not to the limitations of the developmental experiences per se. Of course, both can be factors operating in an individual child.

The second factor is that children who become physically disabled due to trauma or disease display cognitive deficits according to which areas of the central nervous

system have been affected. The concept of crystalized intelligence is that abilities have become localized in different parts of the brain. Hence, trauma in various parts of the brain will directly affect certain abilities and leave others quite unaffected.

B. The major factors in evaluating physically handicapped children involve: 1. the limitations provided by the limited motor expression areas - both the use of the hands and the ability to vocalize (articulate). If either mode is adequate, tasks in those areas can be used without motor deficits contaminating the results. When performance is dependent upon speed, the performance will, of course, suffer while the ability underlying the task demands (spatial organization or visual reasoning) may actually be very high, and 2. the child whose expressive channels when using his mouth or hands is so limited that a new response system is required. Probably no task demands more creativity on the part of the examiner than that of evaluating a severely handicapped child with cerebral palsy or a related disorder. Any system (eye blinks, two distinct sounds for yes or no, movement of the right or the left hand) of responding will at least allow the examiner to ask certain verbal questions and to manipulate visual materials and then have the child respond. Since all of the tasks discussed earlier involve measures of the child's performance, in many instances it is impossible to assess an ability at all and be certain or comfortable that the measure does correspond with the child's actual competency. (As an aside, the answer to these difficult evaluations lies in a different direction - the neurological functions being measured directly such as seeing how many presentations are required before a visual stimulus no longer creates certain types of brain waves due to recognition.) In some instances the child can tell you where to place blocks or puzzle pieces, and in this manner of problem solving show you how his thought processes operate, but some verbal dialogue is required in these instances.

C. Moving to the formal assessment situation, let us look at some of the things we have talked about in this chapter and see how they might affect test results and how we might still look for, and find, relatively strong ability levels. In any testing situation, one of the first things we do is to get a background history of developmental milestones and overall development. In this way, we can get some idea of the extent to which a child's social and cognitive development has been affected. A child who exhibits poor test performance but who has learned some independent behaviors will probably have greater

potential, with fewer interventions necessary, than one who has had overprotective parents who have discouraged independence and even opportunities to gain experiences from interacting with the environment. It is very important to know about these things; questions designed toward eliciting this information should always be asked. In fact, a test administered and interpreted without the additional data obtainable from a clincal-type interview is hardly ever, for practical purposes (other than research ones), a really useful and worthwhile undertaking. Looking for these children's strengths is especially tricky, and in some cases the tests you use might not reveal any of them. Parents will often report an ability or a manner of communicating that reveals information or a means of eliciting an ability which you had not considered.

The emotional development of a handicapped child might affect test rapport and hence test performance, in the same way (but probably more so) as with non-physically handicapped children. These children especially become anxious if they think they are being evaluated, and this situation becomes even more difficult when they know that they cannot even undertake, never mind complete a task, because of their handicap. On intelligence scales such as the WISC and the Stanford Binet, it is probable that the child's level of attainment on verbal-type tasks will be higher than on the broad class of performance tasks. However, even in the verbal area the test might be measuring areas in which the child has had limited exposure. Social comprehension type questions (as found in Comprehension, Social Adjustment A and B) might be particularly susceptible to this problem. As such, certain areas of vocabulary or concept formation may be very high indicating good verbal reasoning abilities which become lower as influenced by areas of content with which the child has had limited exposure.

Visual and non-verbal reasoning tasks (Leiter, Ravens, Picture Completion, Pictorial Absurdities, Visual Reception) have these same variables operating. Those like the Ravens which deal with shapes, patterns, and non-meaningful stimuli are the least affected by limited experience. Those which present social situations or objects with which the child has not had an opportunity to interact, experience, or learn about, may give an incorrect measure as a cognitive indicator. One of the most basic tenets of all formal psychological tests is that it is assumed that the child has had opportunities to be exposed to those ideas and tasks which would prepare him to respond to the test. To the extent the child has not had this exposure, his unfamiliarity, rather than his cognitive functioning, may pro-

duce a low performance.

Other tests such as the Beery, and the Bender, involving fine visual-motor integration, can obviously not be used with many physically handicapped children. The emphasis here should rather be on using devices which your common sense will tell you, after considering the particular handicaps of the child, that performance interference due to the handicap will be minimal. The Frostig subtest of Position in Space is an example of how the perceptual aspect could be measured without the motor component interfering.

Many physically handicapped children have some physical involvement of the dominant hand and it is often useful to allow them to use the non-dominant hand. On the Draw-A-Person test, fewer details and some of the previously mentioned "distortions" will be evident, but this is still a technique for assessing body image and spatial relationships. Briggs and Nelson[6] found that the fewer details and fewer points for coordination resulting from using the non-dominant hand lead to a tendency to reduce mental age scores which might be earned using the dominant hand. Amount of loss varies, but the average is about a year's loss in mental age. Maze tests are also affected, but more so in qualitative than quantitative ways[7], so you might try giving a child the Mazes on the WISC-R with the non-dominant hand. Briggs' experiment suggests that results on the WISC-R mazes might not be adversely affected by using the non-dominant hand. Similar studies have shown that other tests are variously affected by using the non-dominant hand[8]: digit symbol is greatly affected on the WAIS, so coding on the WISC-R probably will be too, but other WAIS subtests such as block design, picture arrangement and object assembly were not. Of course, in some children both hands might be quite involved, limiting all tasks requiring motor performance.

D. Naturalistic observation can be very important with this group of children. Tasks the child can do outside the testing situation will be reported. Many strengths can emerge in

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6. Briggs, P. and Nelson, S. The effect of non-dominant hand execution on the Goodenough Draw-A-Man test. Journal of Clinical Psychology, 1964, 20, p. 496.
7. Briggs, P. The validity of the Porteus Maze Test completed with the non-dominant hand. Journal of Clinical Psychology, 1963, 19, pp. 427-429.
8. Briggs, P. The validity of WAIS Performance subtests completed with one hand. Journal of Clinical Psychology, 1960, 16, pp. 318-320.

situations such as play and you should rely on your own non-test situation observations for assessing potential rather than an overreliance on testing tasks, many of which, by their very nature, might be somewhat misleading. There is a certain type of "ah ha" look in these children's eyes also which will indicate recognition, insight, and understanding. As such, we are impressed that those people who are the closest to the child (parents, teachers) will be a rich source of data about a child's potential.

MENTALLY RETARDED CHILDREN

It may seem unusual to include a group like children with mental retardation in our search for cognitive giftedness, as they are the lowest 2% of intellectual ability by definition. We do so, however, for two reasons: 1. Many children are misdiagnosed, especially in pre-school or early elementary school age years. Children with emotional problems, sensory problems (hearing), or physical problems (cerebral palsy for instance) create pseudo-retardation pictures in terms of manifest performance. Great care is necessary to make sure that the performance is a valid indicator of the person's current level of cognitive functioning, and that there are not some factors in either the background or the current psychological functioning which would make a child perform much below his actual potential. 2. There are certain children whose ability to conceptualize and abstract is well within the retarded range of intelligence who manifest a splinter skill in the superior range. These children, so called "idiots savants," do high level feats of memory ordered around very closed systems such as numbers, music, or calendars. They are able to memorize and work with the units in this system at a superior level, even though they may be unable to answer an elementary question involving abstraction. Generally, the above tendency can be inferred from naturalistic observations, (e.g., the child knows the batting average of every American League baseball player or he can tell you the birthday of every child in his dorm). It is important when evaluating to attempt to use an area of familiarity for the child.

LEARNING DISABLED CHILDREN

The contents of this section will involve four major areas of dysfunction found in children that interfere with academic achievement and performance: 1. language deficits and problems in conceptualization, 2. problems in memory and sequencing, 3. spatial perception, 4. motor and visual-motor integration. Any of these four areas may make a child be "educationally retarded" when in fact his cognitive skills in other areas may be superior. If he has not found a way to compensate for an area of deficit then the weak-link-in-the-chain determines the level of achievement. Difficulties which arise from these areas also have a way of undermining the child's self-concept and lead to a tendency to avoid tasks and not take risks in terms of responding.

A. A deficit in any of the four areas of functioning mentioned above tends to have a very selective effect in influencing development. What happens is an exaggerated unevenness in development across areas where those deficits retard the growth - for instance, a deficit in verbal conceptualization will hinder abstract reasoning, vocabulary development, and verbal comprehension; a spatial deficit will interfere with aspects of motor planning, non-verbal organization, and social perception. Development in areas not affected by the splinter deficit will proceed in a much more age-appropriate manner.

The result of the above is what we call "a hill-valley" profile of cognitive abilities, meaning very poor and very superior scores all in the profile of an individual child.

Some of the deficits will have a direct bearing on others - such as an auditory memory deficit slowing down vocabulary acquisition - while not affecting others - auditory memory deficits would not interfere with spatial organization at all. Other deficits allow for compensation. Good language skills and an elaborate verbal conceptual cognitive network will aid auditory memory for meaningful input based on the person's ability to associate, and it can even help in other cognitive areas to the extent the child cues himself by talking to himself and in that way develops strategies for motor planning and non-verbal experiences.

To compare the above with the model of differentiation presented in earlier sections, each individual ability develops somewhat independently and therefore either due to a

specific maturational lag or due to environmental deprivation in a particular area (which results in little opportunity to practice a skill and therefore stimulate its development) most abilities can be high with specific areas of deficit. Hence, both biological and environmental factors can be the cause of this lag.

As described above, however, the total independence of functions is not a true state of affairs. There is a selective influence whereby one area of functioning has a differential effect on other areas during development depending upon the mode of reception, thinking, and expressing involved. There is one further tendency which should be mentioned here which often exaggerates this differential effect. Children tend to practice and do those tasks at which they are good (where their underlying cognitive skills are strong). Hence, all of those areas involved have maximum opportunity to be stimulated to develop. They tend to avoid those areas which are more difficult for them. As such, the tendency is for the unevenness of the ability profile to become even more exaggerated.

Learning disability children allow for the clearest picture of cognitive development - both the independence of functioning and the manner of interdependence. Of the four areas discussed in the introduction, memory, spatial organization, and motor integration are basic, automatic areas that emphasize input in the young child (motor integration becomes involved with expressive output as the child becomes older). Hence, tactile, kinesthetic input problems would cause certain cognitive areas such as body image and spatial orientation to be delayed in developing. The general visual perceptual area (spatial organization) causes forming object constancy, visual reasoning, and visual discrimination to be delayed. Both of these areas (motor and spatial) when deficient create a more fluid and less crystalized state of cognitive development because the input is not finely differentiated, constant, and therefore replicable for the child. Rather the world seems to be ever changing, and therefore less consistent information is obtained and less assimilation of the world is possible and less systematic acquisition of the knowledge takes place and therefore less systematic cognitive development is stimulated.

The memory and sequencing deficits will allow for a reduced storage of input in whichever mode (visual or auditory) the child is affected. Since more repetition of information will be required before an experience is remembered, the amount of information around

which a child forms his concepts and sees relationships will be reduced. He may be able to use those concepts which have been remembered at a high level, but the memory inefficiency makes acquiring new concepts a greater effort than usual.

The deficits in language and verbal reasoning are, in distinction to the other three general areas, problems in conceptualization. This symbolic area is crucial because it is the basis of planning, judgment, seeing relationships, and applying meaning to experience. This area involves the ability to form categories and therefore to organize experience and categorize it in cognitive networks. All tasks become easier with this ability as the child can manipulate the symbols in his head and generate expectations rather than having to experience it first hand and learning only from direct experience.

B. The splinter deficit does not per se influence the assessment procedure unless the child has become overly sensitive about his difficulties and therefore attempts to avoid all tasks by refusing to guess or attempt a task. To the extent that the child is motivated in all of the tasks, the assessment will not have to be altered in any manner for a learning disabled child.

C. The analysis of the test data is the search for the areas of superiority. These are very often found, even in children whose academic achievement is very delayed, because the reason for the academic deficit would not cause a general delay in the other cognitive areas. The general distinction is the high verbal - low performance or low verbal - high performance dichotomy. These can be quickly assessed as most of the major testing instruments (WISC, ITPA, Detroit) have this verbal/non-verbal arrangement built in to the test. A second distinction would be the more automatic memory skills versus the higher order conceptualization skills. The distinction would be between how efficiently a person processes information (Digit Span, Visual Sequential Memory, Auditory Sequential Memory, Visual Closure, Attention Span Subtest, Oral Directions) which we consider to be more automatic functions, and how well the person can internally manipulate the symbols to decode a message, see relationships, and formulate new symbolic arrangements (Vocabulary, Picture Arrangement, Ravens, Leiter, Auditory Association, Visual Association, Pictorial Absurdities, Verbal Absurdities, Social Adjustment A).

The goal in all of the above is not just to find a specific subtest or two on which the person performs at a superior level and thus proclaim that there is a superior cognitive ability, but rather to rank order the subtest performances and see what "thread" or "theme" emerges, using the dimensions of task demands outlined in earlier chapters. If it can be shown, for example, that the more memory involved the poorer the person does, but with little memory required and more of an emphasis on thinking, the performance approaches superior levels, and when it is thinking in a purely non-verbal, visually oriented manner, the level of performance is very superior, we now have a description that not only describes the profile of abilities we have found, but it also will allow us to predict how the person will do on new tasks (how much memory vs. thinking is involved; whether the thinking is verbal or non-verbal), and it will allow us to design tasks to take advantage of the very superior levels of certain cognitive processes.

The motor integration/visual-motor integration area is deserving of some special comment. The early workers in the area felt that delays and inefficiencies in these areas were basic and crucial because motor movements, and the resulting match between motor movement knowledge and the developing perceptual input (sensory-motor and perceptual-motor learning) served as the basis for later cognitive development. We have found this scheme not to be helpful in children with learning disability type problems (minor motor integration problems). We have seen many children with lags in motor development, who are clumsy and uncoordinated, and who show visual-motor difficulties when using a pencil; yet these children may perform at a superior level on verbal language tasks and both verbal and non-verbal reasoning tasks. As such, the delay in the motor integration does not seem to affect the ability to deal with symbols and to perform higher order reasoning tasks.

The area where we have found a visual-motor delay interfering is written expression. Often these children are not only poor test takers in school (written tests), but written reports, spelling words, and all types of essays are monumental ordeals. It seems as though the mechanics of writing, which is supposed to become automatized, still requires a deliberate, conscientious effort. By concentrating on the mechanics of writing, the flow of thought is disturbed and very low level written ideas are expressed. For this reason,

a group, written, IQ or achievement test should always be viewed with suspicion as an example of the child's cognitive abilities.

D. Learning disabled children give many excellent naturalistic observation opportunities to identify potential cognitive excellence. The reason is that they, like most of us, tend to like to do the things they are good at and avoid those that present problems. As such, if given free activity opportunities (when academic demands are minimized) a child may be found who can disassemble an engine, build a complex tree fort, draw pictures of space vehicles in great detail, create stories worthy of children's book publication, and discuss baseball statistics for hours - all of the statistics discussed from memory. It is these observations which should alert someone to the necessity of attempting to delineate more specifically the areas of cognitive superiority, regardless of the low level quality of the school work. Creative play situations, rapid learning of high interest material, and an ability to construct and organize will all be possible to observe.

THE MINOR SOCIAL AND EMOTIONAL DISORDERS

The content of this section will involve: 1. the less severe affective responses (anxiety, anger, depression), 2. behavior problems (acting out, negativism), 3. conflicts (fear of failure, fear of criticism, passive aggressive tendencies), and 4. self concept issues.

A. The major emotional and social experiences interact with other areas of development to either facilitate or hinder their development. When the child is secure and satisfied, the positive interpersonal encounters create a feeling of curiosity and competence and thus encourage and facilitate cognitive development. When the child is deprived of both affective and perceptual experience as in Sptiz's studies of hospitalism, the child's intellectual development can be retarded. As such, a stimulating, secure environment where basic needs are consistently met allows the development of perceptual and cognitive skills to occur as they are supposed to.

Another important aspect of early development is the amount of curiosity, autonomy, and initiative encouraged by the environment. When these are supported, the child's curiosity and eagerness to explore, initiate, imitate, and practice are conducted naturally. When anxiety, guilt, or disapproval causes an inhibition in these areas, the result is a lessening in cognitive development.

The level of stimulation and emotion in the environment is also a crucial factor affecting development. As discussed above, too little may cause a deprivation condition and hamper cognitive development. Too much, however, causes the child to be overwhelmed and thus to use energy to defend against and attempt to cope with the stimulation or emotion. Too much anxiety, anger, or sadness may thus lead to a withdrawal from the real world into fantasy as a defensive maneuver, and being preoccupied with an event does not allow more natural interactions and learnings to take place.

The parents become crucial models for the child, to stimulate, encourage, protect, and challenge. To the extent that they serve to increase anxiety over performance, the resulting fear may actually serve to hamper a child's performance and increase his tendency to avoid tasks. The child, struggling to assert a certain amount of autonomy may become truant, act out and refuse to work, or act in a very quiet, passive-aggressive manner and just quietly fail. In these situations, the more interest the parents show in

academic achievement, the poorer the child seems to do. These very dynamic interpersonal conflicts will affect the child's performance more than his actual cognitive development, and his cognitive skills may be underestimated.

As such, the emotional, affective side of development interacts with the cognitive in an active manner. When secure and satisfied, the child's development in each facilitates development in the other - finer differentiations, attempts to assimilate knowledge, attempts to learn to acquire pleasure and mastery.

The less severe effects (anxiety, anger, depression) are part of everyone's development. As they are associated with developmental crises and situations within the child's capacity, they serve as springboards to more development. To the extent they are beyond his capacity. they serve to inhibit development, create defensive operations or regressions, and distort the development of ego functions in general in many children. The result can be a withdrawal from the world or a vigilant watching of it. In this manner cognitive skills are either inhibited or distorted, and the free interaction with the environment where the learning can take place in a systematic manner does not occur. It is true, however, that certain areas can be stimulated to develop at very high levels in a defensive way, e.g., the visually vigilant child, or the child for whom words become a way of blunting intense feelings.

The acting out child tends to translate his impulses into activity, and with this tendency, the cognitive skills of reasoning, judgment, and consideration do not take place. We have even seen children with severe hyperactivity (MBD) who were language delayed as best we could tell simply because there was no attempt to bind the impulse with words, but rather to act them out. As such, their memory and associational skills suffer. These children responded very well to language therapy by a speech clinician.

The child who develops a specific conflict generally has his performance affected rather than his cognitive development. A neurotic inhibition in learning, a failing tendency as a means of retaliating against parents, or a fear of failing will all affect school and task performance, even when the cognitive skills are present. It is the conflict which interferes with the ability to use the skills. We have seen children with IQ's of 130 who were unable to put their thoughts in writing, children who became so nervous they were unable to remember what they had learned, and children who perceive learning as a coercive task and so resist all aspects of it.

The last area to be commented on is the generalized "schnook" syndrome - a child whose self-concept through development becomes based on feelings of inadequacy, incompetence, a lack of mastery, and a feeling of being "no good." We are impressed that these children often act stupid and do not try to do tasks successfully based on their expectations of failure. The result is an avoidance of tasks, a quick-to-frustration tendency which limits learning, makes the child avoid new opportunities, and prevents him from a self-critical analysis of his experience so as to profit from the feedback he receives and therefore assimilate new information. As such, his cognitive development is not stimulated and his performance continues to reinforce his felt inadequacy.

As may be seen from the above, the emotional life of the child is important both in the role it plays in stimulating cognitive development, and the role it plays in allowing the child to utilize his cognitive skills on tasks. While the above does not do justice to the richness of the process, it suggests the overview of the development as we perceive it. The sense of cognitive development, "learning," and performance have been intermingled more in this section than in others because the minor emotional disorders influence each. Again a more complete differentiation is in order, but it is beyond the scope of the goals of this paper.

B. Any child who is anxious or preoccupied about the idea of being evaluated is high risk for performing below his potential. These children require a great deal of rapport building and structuring of the assesment to reduce their anticipatory anxiety. No testing should be attempted until they are comfortable with the examiner and the examining situation. When the child is quiet, withdrawn, and overly inhibited, an effort to draw him out must become the first priority. We prefer to attempt to use the relationship to draw out the child rather than other types of concrete reinforcements.

The child with a negative attitude and poor motivation should be given the time to adapt and adjust to the situation. We have seen many instances when the negativism was a defensive maneuver based on issues of inferiority and autonomy. If respect is shown, and an attempt is made to explain what the tasks will be, and if the child is asked if he has a preference about the order of the tests, often cooperation will be won.

We will not accept quick "I don't know" responses; rather, the child is made to guess, to elaborate, to tell us all he knows. In fact the major goal is to facilitate this spontaneous ex-

pression on the part of the child.

A similar problem is the quickness to frustration. If a child fails to immediately solve a problem, we encourage further problem solving activity. Without these efforts, it is easy to underestimate the child's abilities based on his abrupt response.

The last variable to monitor is the child's emotional level and tendency to let his attention wander. Anxiety, anger, preoccupation, or general negativism will all lead to an attempt to be distracted or not to focus on the task at hand. Periods of conversation between tests or structuring the task ahead and only proceeding when the child affirms his concentration will be required.

C. There are several important dimensions to focus on with children who are suffering from high levels of emotion or who are preoccupied with certain ideas. They tend to pick up new information poorly, hence memory tasks or long questions are areas in which they do poorly. We like to focus on short questions (Aud. R.), overlearned material (Vocabulary), social judgment (Comp., Social Adjustment A and B) and the performance items. Unless the child is suffering from a depressive, psycho-motor retardation, doing tasks with blocks, puzzles, and visual pictures (Block Design, Picture Arrangement, Pictorial Absurdities, Visual Reception) allows for concrete stimuli to be focused on rather than dealing with a pure thinking task. The tasks that are the most affected by anxiety are the memory tests (Dig. Sp., Vis. Seq. Mem.) and tasks requiring concentrated sequential thought (Arithmetic).

There are certain children whose anxiety centers around social stimuli. In these children those subtests dealing with social judgment and comprehension will be affected (Pic. Arr., Comprehension, Social Adjustment A) while their ability to deal with words or concrete objects may be very high.

Children who tend to act out or who are defensively repressive and inhibited both tend to take in new information and focus on details as well. Those tasks in addition to memory, which require concentration and making fine discriminations (Pic. Comple., Vis. Clo., Pictorial Absurdities), will often be depressed as the child is not able to do critical visual scanning, although his thinking skills may be very high.

Another common profile for children with minor emotional and behavioral problems is a constricted expressive tendency based on anxiety and doubt (poor self-concept). While the child is willing to answer yes or do tasks emphasizing performance tasks, he will not expand on verbal expression in any detail. As such, we look to those tasks which emphasize reasoning and minimize verbal expression (Similarities, Aud. R., Aud. Assoc.) to display the highest verbal language reasoning skills.

D. Children with minor emotional problems will generally manifest many opportunities to observe their true cognitive functioning. The reason is that they use play, play materials, and artistic opportunities (drawing) to express the feelings and conflicts. The level of sophistication, the nature of cause-effect relationships, the organization and construction involved will all shed light on a child's memory, reasoning, motor and perceptual skills. We consider art in all its forms as wonderful opportunities to make the latent abilities manifest. Other children are more "machine oriented" and thrive on engines, magnets, and cars. To the extent that the child is more comfortable interacting with an impersonal, concrete object than with people, he will display his higher level of functioning there.

SEVERE SOCIAL AND EMOTIONAL DISORDERS

There are probably few areas of severe emotional problems in children which are more fascinating, in a bizarre way, and more popularly misunderstood, than "autism." This diagnostic label is frequently misused and very frequently mistaken for psychosis. It is important to make a distinction between autism and childhood psychosis, and the aim of the first part of this chapter will be to do just that. We shall then see how autism and childhood psychosis will affect testing.

A. The following ideas are found in the work of Knobloch and Pasamanick[9]. Normal infants become socially responsive to people at a very early age. Even 12-week old babies smile and coo in response to movement and the sound of a human voice. Infants become more and more absorbed with people as their emotional and cognitive development interacts and grows. This process was the basis of the discussion in the preceeding chapter. When social interaction does not occur, and the child's behavior seems to arise from within himself or herself, it does not appear related to the environment and may be accompanied by a variety of repetitive bizarre mannerisms and agressive, destructive, and self-destructive behaviors. The behavior is not goal directed, the child does not learn from the experience, and there is no attempt to facilitate cognitive development.

One of the cardinal characteristics of autism is that it be present from birth or the first few years of life, and observation of infants and young children is often very important so that one does not have to rely only on retrospectively gathered information in establishing the antecedents of behavior seen at later ages. There are three essential diagnostic criteria for autism: 1. The presence of persistent failure to regard people as persons. This does not mean that the children are aware of people but deliberately withdraw from them in fear or rejection. Autistic children may reach out with their hands, but they will reach for eyeglasses or hair or clothing - objects, not people, are the goal of their grasp and there is no social interaction at all; even what might be called "eye contact" is inappropriate behavior. 2. These children show a desire for the persistence of sameness. They not only insist that the environment remain the same, but also end-

9. Knobloch, H. and Pasamanick, B. Gesell and Amatruda's Developmental Diagnosis: Third Edition, Revised and Enlarged. New York: Harper and Row, 1974.

lessly repeat changeless behavior. The child does not assimilate the information and move on to new learning, rather he remains fixated on the same circular behavior-reaction pattern. When this behavior is interrupted in children of either age group, we may observe rage reactions. (It is important not to misdiagnose as autistic those severely mentally dificient children who also display bizarre repetitive behavior, since they usually show social responsiveness even if it is very immature.)3. Failure to use language for purposes of communication is the third important criterion; and when all three of these criteria are satisfied, we may make a diagnosis of autism.

Autism can be seen to be a complex of behavior symptoms and not a specific disease entity. An overwhelming number of these children have some sort of organic disease of the brain with many aetiologies. In the vast majority, but not in all cases, there is an association with mental dificiency and a high incidence of language disorders in addition to those related to the mental deficiency itself. Also, there is a high incidence of typical and atypical convulsive disorders. As such, a basic cognitive deficit is seen as the central problem and the resulting three behavior tendencies and manifestations of this deficit are an attempt to cope with it. Experiences cannot be integrated or interpreted by the child which results in withdrawal from the social world and a further distortion of cognitive development. Even with structure and concrete tasks, the neurological dysfunction - cognitive defect limits the use of symbols and the ch.. who is truly autistic will not display superiority in any area of cognitive functioning. Rote memory would be the only exception, but even it is generally not found at a superior level.

When we talk of childhood psychosis, we mean something different from autism. In general these disorders do not satisfy all three of the criteria for autism but are still very severe. Some schizophrenic children, for example, may be very withdrawn, but this withdrawal may be only partial and they may still be in contact with reality, or selectively withdrawn. Such children may, in addition, manifest such symptoms as unawareness of their own personal identity, anxiety, excessive or diminished or unpredictable responses to sensory stimuli, and a distortion in mobility patterns. There may be identifiable traumatic incidents of a stressful emotional nature which are partly aetiologically responsible, which is not necessarily the case in autism. For example, disturbed parental attitudes and re-

lationships, separations, sensory deprivation, and exposure to sudden shock or terror may have occurred. In addition, there may be an organic aetiology such as an inherited predisposition to schizophrenia, tumors, metabolic disorders and head injury. To the extent that the cognitive skills are capable of being developed, that is, there is no central nervous system dysfunction, the influences are similar to those described in the preceeding chapter on mild emotional disorders. There is certainly, however, the possibility of having very high level cognitive skills. One difference between childhood psychotic conditions and schizophrenia in adults is that the child is in the process of developing functions - hence any interference in any sphere (anxiety, poor motor control, stimulus deprivation, poor models) has an influence on other areas either directly or indirectly. With an adult whose development seemed adequate through the first 18 years of life and who then suffers a schizophrenic breakdown, the cognitive skills have been developed, and now they may even be used in the service of the psychosis - bizarre ideation, noticing details and creating delusions about them.

From what you have read so far in these chapters, you can see that almost any of the handicaps will have an effect on cognitive development. This is the case because emotion plays a part in developing the functioning of intelligence. Emotion is motivation; without emotion there would be neither interest, need, nor motivation, and so no problems would ever be posed and there would be no stimulation of development in intelligence. Emotion can have effects which can interfere with all the processes necessary to move from fluid intelligence to more and more differentiated abilities. Every interference with environmental interaction and physical maturation will interfere with cognitive ability, particularly at crucial early stages in development.

B. The great difficulty in assessing an autistic child is the impossibility of establishing rapport. This difficulty will interfere with assessment right from the beginning and observations will be the best source of data. Since the child will not respond appropriately to tasks or questions, it will be necessary to make inferences from the way he manipulates objects, organizes his play, solves problems, and learns routine. Rely on naturalistic observations in non-testing situations also because the child may be able to perform tasks which you did not see in the office. Again history and interview data with parents on motor, social, and self help skills will be crucial.

C. With intellectual assessment of psychotic children there may be other problems. Incorrect responses on many subtest items may be the result of impaired reality orientation rather than cognitive deficit. In fact, the answer may be a very high level cognitive response, only incorrect due to his inappropriate reality contact. Many depressed children will have such a low energy level that anything involving psychomotor performance may be lowered, so if you administer a battery of tests to a depressed child and obtain a performance IQ significantly lower than verbal IQ, try to give the performance subtests on a day when the child's mood is elevated. Other children may have enough energy to devote to the performance tasks, but fail to comprehend how the materials go together. The child's withdrawal compared to the child's failure are very different factors in a test score, and we attempt to discuss the child's ability and willingness to cooperate as a major part of our report about these children.

If the psychosis is manifest in the verbal language/verbal reasoning area, tasks requiring much thought and verbal expression will be lowered. The quality of the answer the bizarreness of the ideas, or the inability to form any answer will generally allow a distinction between low cognitive skills and innapropriate ideation. These children, however, may deal with concrete objects, paper-pencil tasks, and non-verbal reasoning tasks at a high level.

The social versus non-social stimuli is an important dimension to examine with these children. A child who has been traumatized or abused and gradually withdrew from reality may be totally unable to draw a picture of a person but able to reproduce geometric designs in great detail. Likewise using blocks may produce high level responses, but puzzles with real objects represented may produce less adequate responses.

D. We have discussed the need for and importance of naturalistic observation throughout the body of this chapter. The underlying rationale is that the child represents both the complexity and the level of integration of his cognitive skills in his play. Hence, the focus on the complexity, organization, and manner of the child's play will often give an observer a better indication of the child's cognitive development than the structured assessment with these very hard to reach children.

CONCLUSION

Only several points need to be summarized as a manner of emphasizing what we consider to be our objectives.

1. To stress the concept of ability clusters that are somewhat independent and therefore uneven in their level of efficiency and performance. Hence a cognitive superiority may be general or it may be specific.

2. To stress the dimensions along which the test stimuli vary so that their task demands may also be clustered and ordered along these various dimensions. In this manner, interpretation of the test data will point to a trend which allows the limits of the superiority to be more clearly defined.

3. To stress how complex cognitive development is and to briefly describe how various handicapping factors influence the process.

There are two further comments we would like to make. One is a certain sense of incompleteness about the content we have written. Each area we touched on could be greatly expanded. If we stimulate ideas, further reading, or a new perspective for the reader, then the work has been successful. Secondly, the stress on cognitive development is not to elevate it above other areas of development. Our response to the question - How can I facilitate my child's cognitive development (assuming a child with no handicaps) - is to love him and make his development as secure and satisfying as possible. We would say the same to the parents of exceptional children with the added modifications of compensating for and working with the handicapping area more specifically.